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OPERATING INSTRUCTION MANUAL



MODEL L5-C

SERIAL # 3499

SWEEP GENERATOR



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# MODEL L5-C SWEEP GENERATOR

## SPECIFICATIONS

|                                |                                                                   |
|--------------------------------|-------------------------------------------------------------------|
| CENTER FREQUENCY RANGE         | 25 to 75                                                          |
| SWEEP WIDTH                    | .1 to 40%                                                         |
| SWEEP RATE                     | 60 cps                                                            |
| OUTPUT VOLTAGE                 | 1 volt                                                            |
| OUTPUT IMPEDANCE               | 50 ohms                                                           |
| ATTENUATION                    | 20, 20, 20, 10, 6, 3 db. toggle switch<br>plus vernier - 0-10 db. |
| DISPLAY LINEARITY              | 1.2:1                                                             |
| LEAKAGE                        | Less than 10 microvolts                                           |
| FLATNESS                       | Within 5%                                                         |
| SCOPE HORIZONTAL SWEEP VOLTAGE | Sawtooth waveform approx 40 v. p. to p.                           |
| ZERO BASE LINE                 |                                                                   |

PHYSICAL DESCRIPTION      Portable - 10" X 12" X 9½", Black finish case, gray anodized front panel. Weight - approx. 25#

POWER      50/60 cps, 110/120 v., 50 watts.  
fuse 2 amps.

CRYSTAL MARKERS      Crystal-controlled plug-in markers at following frequencies:

|                 |               |                 |
|-----------------|---------------|-----------------|
| <u>52.5</u> mc. | <u>55</u> mc. | <u>60</u> mc.   |
| <u>62.5</u> mc. | <u>65</u> mc. | <u>67.5</u> mc. |

EXTERNAL MARKER INPUT      Marker input for external signal source.

BIRDY-BY-PASS CIRCUITRY      The input from the external marker input is mixed with a sample of the sweep oscillator signal to produce beatnotes or birdies. These are amplified and superimposed upon the detected R.F. output signal before it is applied to the vertical scope input. Amplitude of the markers is adjusted over a wide range.

TUBE COMPLEMENT

|                               |           |
|-------------------------------|-----------|
| 1 -- 12AV7                    | 2 -- 6AV6 |
| 3 -- 6AV6                     | 4 -- 6AR5 |
| 5 -- EL84                     | 6 -- 6Y6  |
| -- 6C95 (10a for each marker) |           |





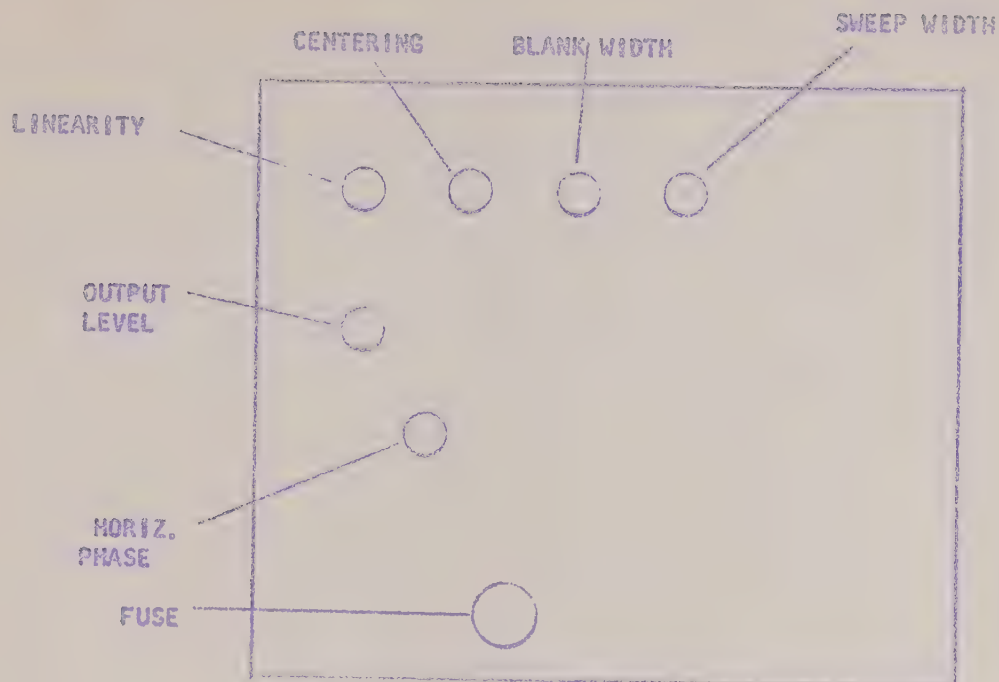
# MODEL L5-C

## DESCRIPTION OF FRONT PANEL CONTROLS

|                       |                                                                                                                                                                                                                                |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SWEEP DIAL            | Approx. center frequency of sweep.                                                                                                                                                                                             |
| ATTENUATOR            | Toggle switch attenuator provides indicated amounts of attenuation.                                                                                                                                                            |
| VERNIER ATTENUATION   | 10 db. of vernier attenuation.                                                                                                                                                                                                 |
| OUTPUT                | Sweep output 50 ohms (BNC Connector)                                                                                                                                                                                           |
| SWEEP WIDTH           | This potentiometer is used to vary the amount of voltage supplied to the variable inductance and can be used to adjust the sweep width.                                                                                        |
| MARKER SWITCHES       | Supplies B-plus to crystal oscillators when switch is in "up" position                                                                                                                                                         |
| MARKER SIZE           | Varies the amplitude of the marker signals.                                                                                                                                                                                    |
| EXTERNAL MARKER INPUT | Marker input for external signal source.                                                                                                                                                                                       |
| SCOPE VERTICAL        | This connector should be connected to the vertical input terminals of the scope for viewing the demodulated signals and markers.                                                                                               |
| SCOPE HORIZONTAL      | These terminals are connected to the scope horizontal amplifier input. Using the waveform at these terminals will produce a more linear and more stable presentation than by using the internal horizontal drive of the scope. |
| DEMODULATED INPUT     | The demodulated signal from the device being tested is fed into this connector so that marker signals may be superimposed.                                                                                                     |
| MARKER SHAPER         | Varies the width of the marker signals                                                                                                                                                                                         |
| POWER ON/OFF          | Power switch.                                                                                                                                                                                                                  |







- LINEARITY** Varies the linearity of the horizontal output sawtooth and is adjusted for the best sweep linearity.
- CENTERING** Controls the average current through the saturable inductance control winding. It is generally set for best linearity when operating at maximum sweep width, which is approximately 24 ms. for this model.
- BLANKING WIDTH** This potentiometer is the grid resistor for the blanking pulse amplifier (V2). It is adjusted to blank slightly more than one-half of the sweep cycle to produce a zero base line.
- SWEEP WIDTH LIMIT** For adjusting the maximum amplitude of the sawtooth drive to the saturable inductance.
- OUTPUT LEVEL** Controls the average B-plus voltage supplied to the sweep oscillator and is adjusted for maximum leveled output voltage.
- HORIZONTAL PHASE** Adjusts the sweep and horizontal phase in reference to the phase of the blanking pulse.
- FUSE** Use 2 Amp. 3AG fuse for replacement.

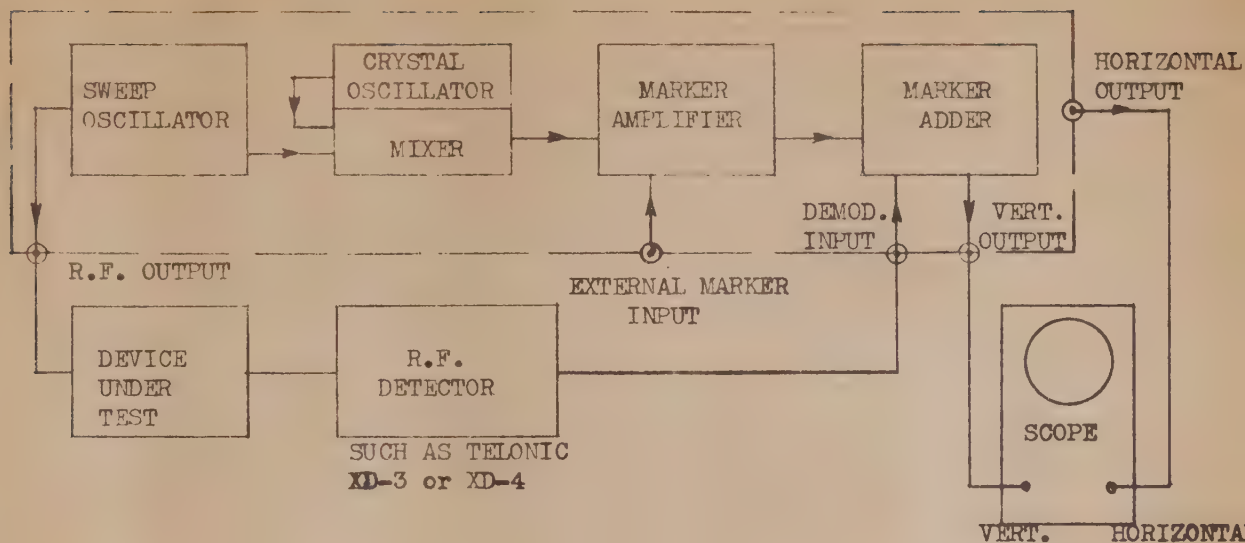


12AV7

12AV7



OPERATING INSTRUCTIONS  
TYPICAL SET-UP



The following procedure is recommended for setting up this instrument in test position.

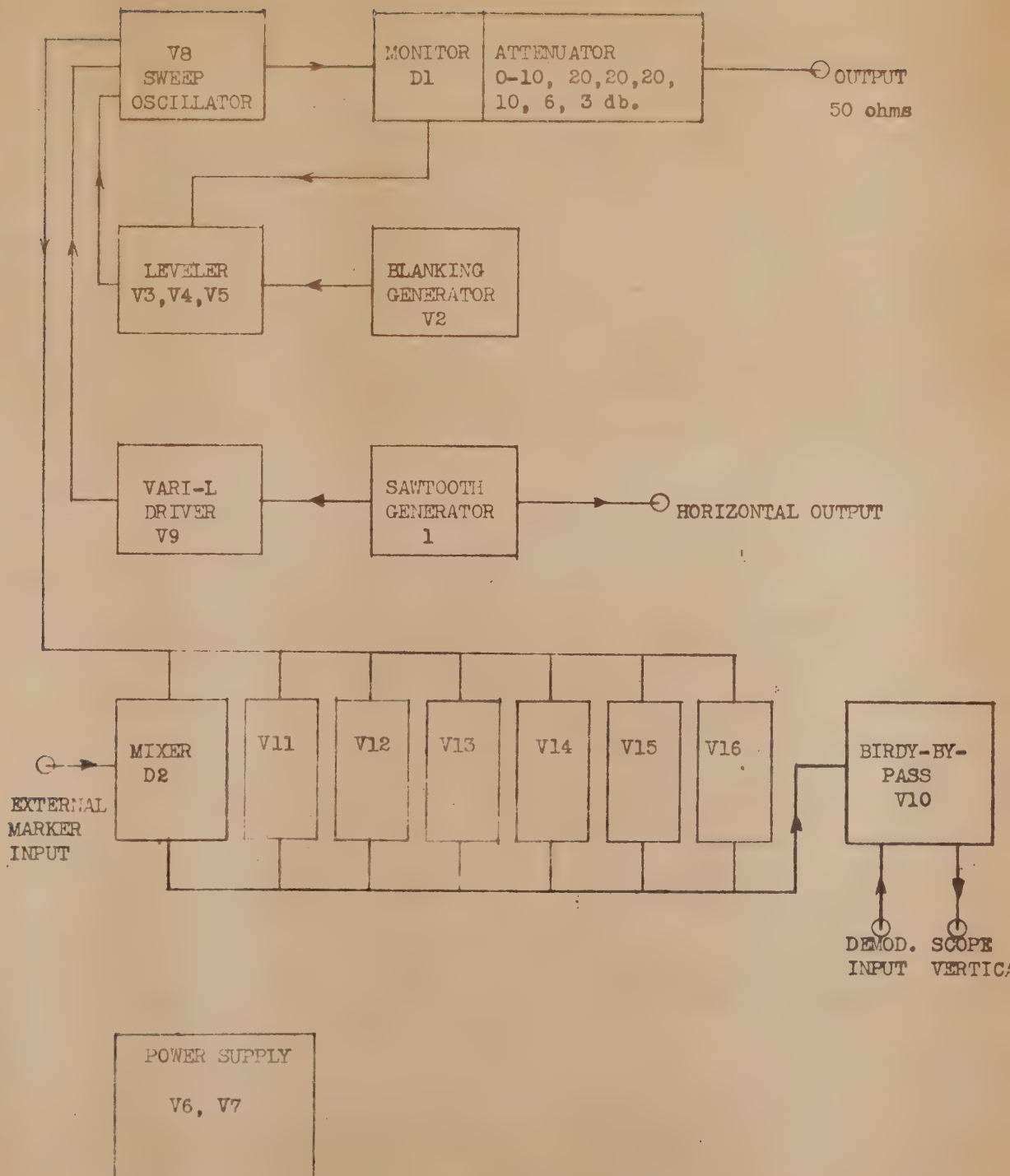
1. Connect unit to 110/120 v., 50/60 cps. supply and switch power on.
2. Make connections to detector and oscilloscope as shown above, omitting the "device under test".
3. Set vernier attenuator to maximum and switch attenuator steps out (downward).
4. Let sweep width to maximum (clockwise).
5. Turn Marker Switches on (up) or inject external CW signal to produce a marker.
6. Rotate SIZE control clockwise until markers are of convenient size.

REAR PANEL CONTROLS are adjusted at factory and instrument is ready to use. However, should it be desirable to check these adjustments, follow these steps.

7. Adjust horizontal phase and Blanking Width to produce a rectangular pattern on scope.
8. Adjust the OUTPUT LEVEL control (R.P.) for maximum Levelled Out-Put at the low frequency end of band.
9. The SWEEP WIDTH may be used to limit the sweep width.
10. CENTERING may be used to adjust the center frequency.
11. Adjust linearity for the most linear display.



# BLOCK DIAGRAM







## GENERAL DESCRIPTION

### BLANKING AND HORIZONTAL CIRCUITRY

The blanking and horizontal sweep voltages are wriginated by square wave producing circuits. The 6.3 v. filament and the 6.3 v. phasing windings of the power transformer are connected in series to obtain a 12.6 voltage C.T. to ground. This voltage is connected through the phasing networks to one of the grids of the 12AX7 and to the grid of the 6AU6.

The square wave output of the 6AU6 controls the KL 84 sweep oscillator voltage regulator tube and thus deprives the tuned oscillator of voltage during  $\frac{1}{2}$  of each cycle. The phase of this blanking voltage is adjusted by the rear panel control so that the lowest frequency being swept is located at the left of the scope presentation. The square wave output of one triode of the 12AX7 is applied to the other triode through an RC network. This is designed to produce a linear sawtooth waveform.

The second triode is connected as a cathode follower and produces the same sawtooth output. This horizontal sweep voltage is used to produce the frequency sweep. A RC network connecting this triode to the horizontal terminals distorts this sawtooth. The linearity control on the rear panel is part of this network and is adjusted for best display linearity.

### AUTOMATIC OUTPUT LEVELING CIRCUITRY

A sample of the sweep oscillator output, at the input to the ATTENUATOR, is detected and amplified and is used to control the plate voltage of the sweep oscillator. The OUTPUT LEVEL control adjusts the bias on the first stage of the amplifier. This causes the DC levels in the entire amplifier to change and varies the average B plus supplied to the sweep oscillator from a minimum of 25 v. to over 100 v. A small decrease in the sampling voltage causes a large increase in the B plus supplied to the sweep oscillator and thus counteracts any amplitude variation as the oscillator is tuned over the range.

The operation of this circuit and of the sweep oscillator can be checked at the feedthru capacitor on the end of the Attenuator box or Pin 1 of V3. The waveform at this point will normally show a flat output level over the entire band. Adjusting the OUTPUT LEVEL will change this level.



## MAINTENANCE

By use of the schematic, operational diagram and the terminal board layout, voltage & waveforms, ordinary difficulties can be readily located and remedied. The following trouble-shooting chart is an additional aid to servicing:

| SYMPTOMS                                  | POSSIBLE CAUSES & REMEDIES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pilot light off and unit fails to operate | <p>Fuse open -- replace</p> <p style="text-align: center;">//</p> <p>If 2nd fuse opens--look for cause of overload, shorted wiring, components, etc. (The 2- 47 ohm 1 watt resistors on terminal board burn out if the B<sub>1</sub> circuit is over-1 loaded and this protects the rectifier and transformer).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| No Horizontal Output                      | <p>Look for difficulty in the sawtooth circuitry V1 using terminal board layout and schematic to check waveforms and voltages.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| R. F. Output is low or zero               | <p>Check B<sub>1</sub> to sweep oscillator - P. 3 (V5) It should be a square wave of 25-100 v. of positive polarity and should vary as the output level control varies.</p> <p style="text-align: center;">//</p> <p>If it is normal, look for RF difficulties--bad tube, shorted or open wiring, defective components, etc.</p> <p style="text-align: center;">//</p> <p>If the voltage is low and does not respond to the leveler control, remove first V4 and then V2. When either of these tubes conducts, the voltage on grid of V5 (Pin 2) is reduced and thus decreases the B<sub>1</sub> to the sweep oscillator. If removal of V2 allows the B<sub>1</sub> on V5 (Pin 3) to return to normal, check the blanking width control, the tube and associated circuitry. If removal of V4 causes the B<sub>1</sub> to return to normal, check the leveler controls, V3 and V4 &amp; circuitry.</p> |

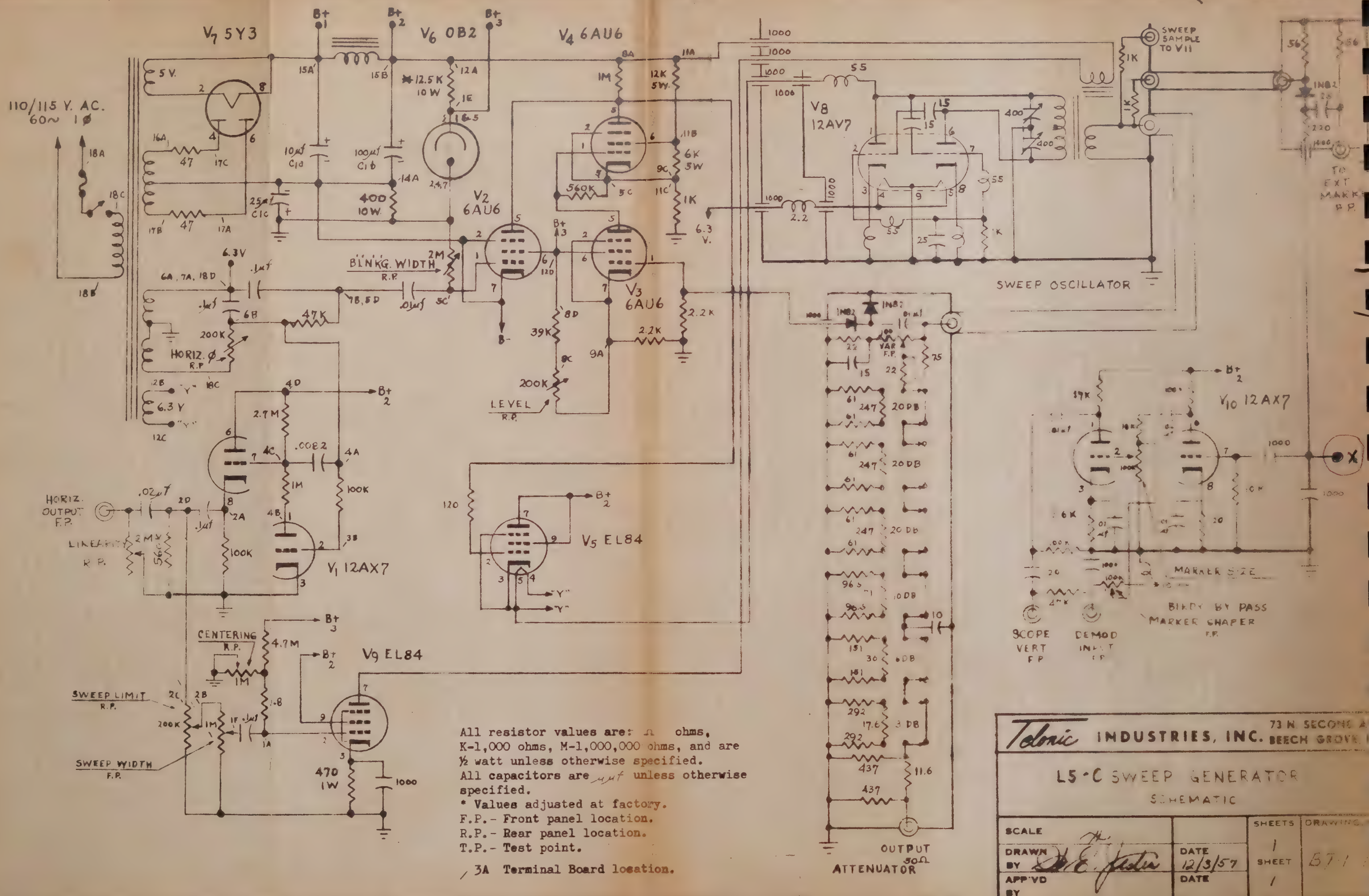












All resistor values are:  $\Omega$  ohms, K-1,000 ohms, M-1,000,000 ohms, and are 1/2 watt unless otherwise specified. All capacitors are  $\mu\text{f}$  unless otherwise specified.  
 \* Values adjusted at factory.  
 F.P. - Front panel location.  
 R.P. - Rear panel location.  
 T.P. - Test point.  
 3A Terminal Board location.

73 N. SECOND AVE.

**Telonic INDUSTRIES, INC.** BEECH GROVE

**L5-C SWEEP GENERATOR**

SCHEMATIC

|                              |         |        |
|------------------------------|---------|--------|
| SCALE                        | DATE    | SHEETS |
| DRAWN BY <i>W. E. Foster</i> | 12/3/57 | 1      |
| APP'D BY                     | DATE    | 1      |

DRAWING: *B7-1*

51 (SWEEP SAMPLE TERMINATION)

V<sub>16</sub>

V<sub>15</sub>

V<sub>14</sub>

V<sub>13</sub>

V<sub>12</sub>

V<sub>11</sub>

**Telonic** INDUSTRIES, INC. 73 N. SECOND AVE.  
BEECH GROVE, IND.

# XTAL MARKER PLUG-IN BASE

SCHEMATIC

REVISIONS

NO. DATE

SCALE

DRAWN

BY

APP'VD

BY

DATE

DATE

SHEETS

SHEET

1

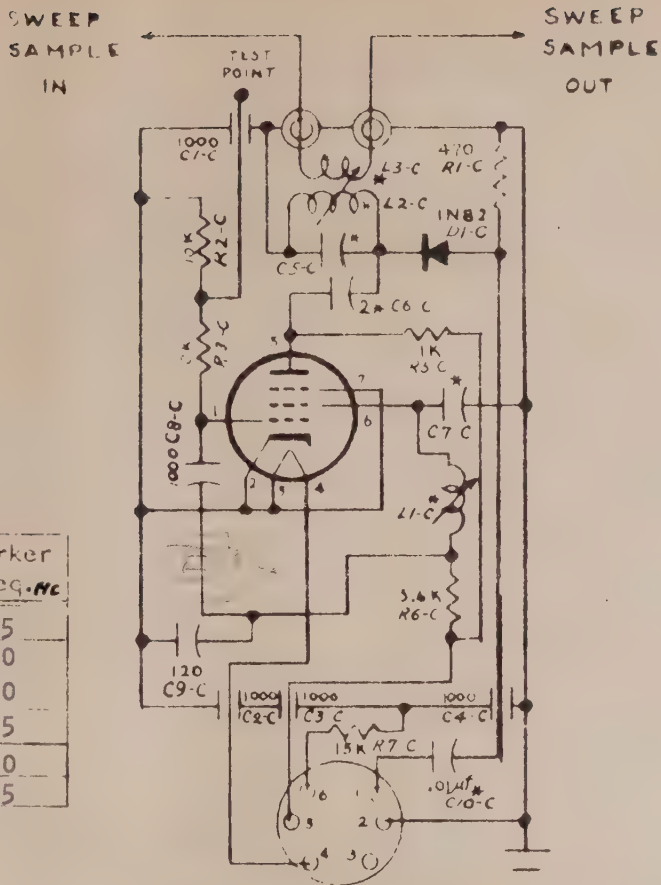
1

A 7-1189

\*\* This value for 6 plug-in markers only.  
When using less than 6 adjust to pro-  
duce 100 to 120 volts B



V 6CB6



PARTS LIST FOR MARKER OSCILLATOR

| VV | Xtal.<br>Freq. <i>MC</i> | Marker<br>Freq. <i>MC</i> |
|----|--------------------------|---------------------------|
| 11 | 26.25                    | 52.5                      |
| 12 | 27.5                     | 55.0                      |
| 13 | 30.0                     | 60.0                      |
| 14 | 31.25                    | 62.5                      |
| 15 | 32.5                     | 65.0                      |
| 16 | 33.75                    | 67.5                      |

## CAPACITORS

|       |                     |
|-------|---------------------|
| C1-C  | 1000 mmf. feed thru |
| C2-C  | " " " "             |
| C3-C  | " " " "             |
| C4-C  | " " " "             |
| C5-C  | ** 500V.            |
| C6-C  | 2 mmf. 600V.        |
| C7-C  | ** 600V.            |
| C8-C  | 1000 mmf. 500V.     |
| C9-C  | 120 mmf. 500 V.     |
| C10-C | .01 mf.* 600V.      |

## RESISTORS

|      |       |                  |
|------|-------|------------------|
| R1-C | 470 * | $\frac{1}{2}$ W. |
| R2-C | 10K   | "                |
| R3-C | 10K   | "                |
| R5-C | 1K    | "                |
| R6-C | 5.6K  | "                |
| R7-C | 15K   | 1 W.             |

### \*\*\* CHANGE WITH FREQUENCY OF MARKER

\* Values of component parts subject to adjustment at the factory.



### WARRANTY

All materials and workmanship in this instrument are guaranteed to be free from defects for one year from the date of purchase. This warranty does not apply if the unit has been altered, improperly handled or damaged in any way beyond our control.

### FACTORY SERVICE

Factory service is available for repair and readjustment of this instrument. However, a description of the trouble plus the model and serial numbers of the unit should be forwarded first, whereupon instructions for correcting the trouble or authorization for returning the equipment will be given. Units sent in for service under warranty or repair of this instrument should be returned to factory, prepaid.



# SWEEP GENERATORS FOR TESTING AND ALIGNMENT OF

BROADBAND F.M. DISCRIMINATORS

R.F. TUNING DEVICES

I.F. AMPLIFIERS

MATCHING DEVICES

RADAR, TELEMETERING

RADIO, TELEVISION

ANTENNAS

R.F. SWITCHING DEVICES

KLYSTRON TUBES

NEW TUBE DESIGNS

DELAY LINES

TRANSMISSION LINES

DEMODULATORS

R. F. MIXERS

R.F. FILTERS

DISTRIBUTION SYSTEMS

TRANSISTORS

## FOR MEASUREMENT AND INDICATION OF

|                    |                   |
|--------------------|-------------------|
| Gain               | Coupling          |
| Bandwidth          | Leakage           |
| Frequency Range    | Attenuation       |
| Frequency Response | Mechanical Faults |
| Spurious Response  | Noise             |
| VSWR               | Efficiency        |

**Telonic INDUSTRIES, INC.**

Telonic designs and manufactures

# SWEEP GENERATORS

*Featuring*

High Signal Level

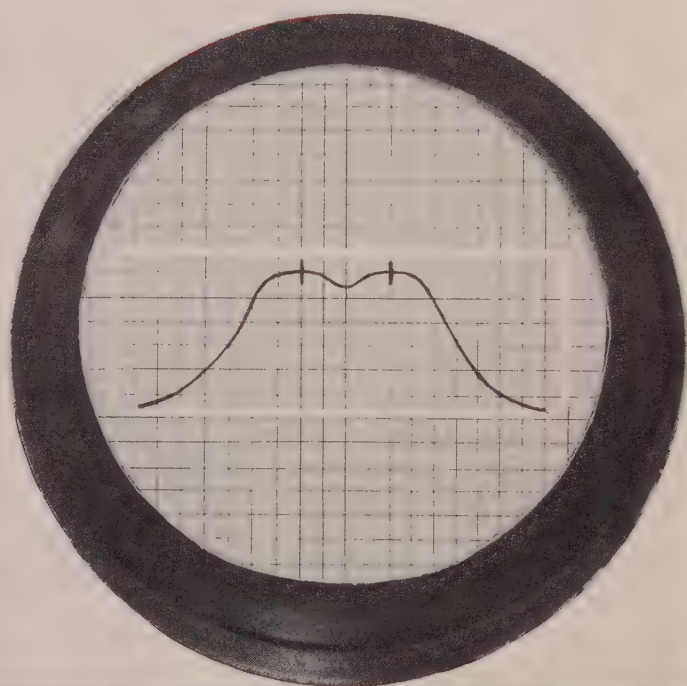
Low Leakage

Flat Output

Low Source VSWR

Accurate Marker Systems

**MANY MODELS**—Many frequency ranges



THESE BASIC MODELS use sweep oscillators operating at fundamental frequency and are available in many ranges up to the limit of the standard receiver-type tube (6AF4A) and tuned-line circuitry. The listed models illustrate the ranges and sweep widths that may be obtained. *High outputs*, exceptional *uniformity* (flatness) and *purity* (freedom from harmonic and spurious content) are prime features of these models.

The model 200 series are fixed-tuned and sweep the entire range. This series is particularly useful for checking tuning devices, antennas, transmission line, broad-band amplifiers, and in making VSWR measurements, etc. The wide sweep technique is a new and powerful tool for *designing* as well as for *production*.



Deluxe Model S5-DT  
Bench Style

THE SWEEP OSCILLATOR circuitry is contained in a tightly-shielded compartment that almost completely eliminates radiation. The precision vibrating capacitor consists of a silver-plated beryllium copper diaphragm. This all-metal unit has no tendency to warp or fatigue. The exceptionally long-life of this wobulator is one of the reasons for the low maintenance cost of Telonic sweep generators.

OUTPUT LEVELING circuitry, using the same technique as in almost all regulated D.C. power supplies, is largely responsible for the high degree of flatness obtained in all Telonic sweep generators.

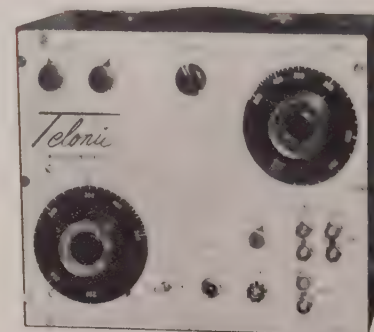
## ORDERING INFORMATION

Designate model by adding appropriate symbols.

- S5 —Basic unit—portable style.
- S5-T —with TA-50 attenuator—portable style.
- S5-FT —with 4 plug-in fixed markers and attenuator—portable style.
- S5-CT —with 4 plug-in crystal-controlled markers and attenuator—portable style.
- S5-MT —with variable marker and attenuator—portable style.
- S5-DT —Complete marker system, attenuator — bench style.

# THE MASTER LINE SWEEP GENERATORS

## ALL FUNDAMENTAL FREQUENCY



Model S5-MT  
Portable Style

## MASTER LINE—Tunable and Fixed SWEEP GENERATORS

| Model  | SWEEP                      |                      |
|--------|----------------------------|----------------------|
|        | Range                      | Sweep Width          |
| S1-T   | 100-200 mc.                | 30%                  |
| S2-T   | 175-350 mc.                | 15%                  |
| S5-T   | 225-500 mc.                | 10%                  |
| S3A-T  | 440-920 mc.                | 6%                   |
| S4-T   | 950-1250 mc.               | 4%                   |
| S200-T | 260-440 mc.                | 180 mc.              |
| S201-T | 325-500 mc.                | 175 mc.              |
| S202-T | 500-750 mc.                | 250 mc.              |
| S203-T | 650-950 mc.                | 300 mc.              |
| S204-T | 800-1200 mc.               | 400 mc.              |
| S205-T | 900-1250 mc.               | 350 mc.              |
| S206-T | 1200-1400 mc.              | 200 mc.              |
| S207-T | { 50-90 mc.<br>160-220 mc. | { 40 mc.<br>60 mc. } |

Output—Over 1 volt p. to p.  
Impedance—50 ohms  
Flatness—5% at max. sweep width  
Vernier Attenuation—0-approx. 20 db.

(See general specs. and features on back page)

## ATTENUATOR AND MARKER SYSTEMS

| Type | Description                                                                                          |
|------|------------------------------------------------------------------------------------------------------|
| "T"  | TA-50 Attenuator                                                                                     |
| "F"  | 4 plug-in fixed markers. Each adj. over wide range. Stability better than .1%.                       |
| "C"  | 4 plug-in crystal-controlled markers with .005% accur. Available for sweep ranges to approx. 600 mc. |
| "M"  | Variable, individually calibrated marker with .25% accur. covering full sweep range.                 |
| "D"  | 6 plug-in fixed or crystal-controlled markers; variable marker; 10 mc. harmonic marker.              |

(The "F" "C" - "M" & "D" systems include Birdy-By-Pass circuitry)

To facilitate your requests for quotations and orders, a handy form may be obtained from your field engineer or from TELONIC.

**Telonic INDUSTRIES, INC.**

BEECH GROVE, INDIANA

TWX—IP-254

Phone—STate 6-9239

# ULTRA RANGE SWEEPS H-1, H-2, H-3

# EXTENDED RANGE SWEEPS

ULTRA WIDE SWEEP WIDTHS are obtained by heterodyning two UHF oscillators whose construction is similar to that of the MASTER LINE units (6AF4A tubes operating at below 1000 mc.) The high signal level of the oscillators and the use of balanced mixer circuitry result in a stable, high level output.

THE TELONIC H-1 is similar to the MASTER LINE Model S3A-T, but, in addition to the fundamental range of 380-900 mc., it has a heterodyne range of 1-380 mc. The output of a fixed oscillator at 500 mc. is mixed with the UHF signal to provide the low range.

Ranges—1-380 mc. and 380-900 mc.

Sweep Width—250 kc-40 mc.

Flatness—HI range—5% at maximum sweep width  
LO range—5% at sweep width of 10 mc.

Output—HI range—1 v. p. to p.  
LO range—.2 v. p. to p.

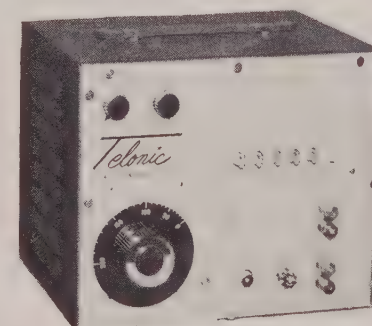
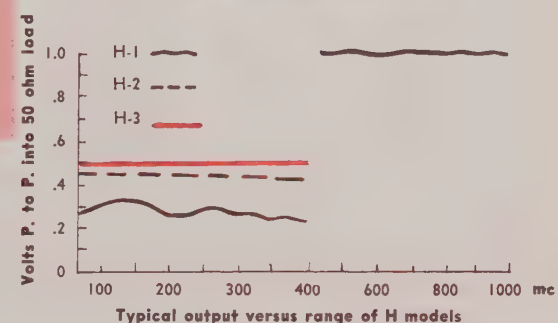
Impedance—50 ohms

Attenuator—TA-50 (See Atten. specs.)

Vernier Atten.—0 to over 10 db.

Style—Portable

(See general specs. and features on back page)



Model H-2



Model H-3

## SPECIFICATIONS

### H-2

Center Frequency—1-200 mc.

Sweep Width—200 kc-200 mc.

Output—.4 v. p. to p.

Impedance—50 ohms (or 75)

Flatness—15% to 150 mc.  
20% to 300 mc.

Attenuation—Toggle Switch 20,20,  
10,6,3, db & vern. 0-10 db.

Marker—External marker input  
only

Style—Portable

(See general specs. and features on back page)

### H-3

1-200 mc.

200 kc-200 mc.

Over .5 v. p. to p.

50 ohms (or 75)

15% to 300 mc.

TA-50 (or TA-75)  
& vern. 0-10 db.

6 Markers—Type  
"C" or "F" and  
Birdy-By-Pass System

Bench

A series of instruments covering the range of 950-2300 mc. is accomplished by a new sweep generator design. Broad frequency coverage and wide sweep widths are obtained without resorting to the more complicated techniques normally used at these frequencies. A TELONIC MASTER LINE UHF sweep oscillator, a harmonic generating crystal and high-pass filter provide a high level, spurious-free signal at twice the frequency of the oscillator. Voltage leveler circuitry maintains constant output.

This new line of sweep generators is available with fixed or tunable center frequencies and with or without marker systems. The standard MASTER LINE Marker systems are available.

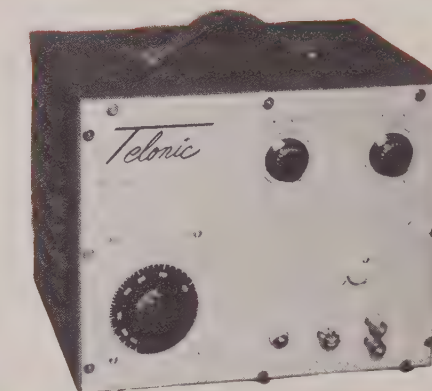
Output—.5 v. p. to p. into 50 ohms

Impedance—50 ohms—Type "N" Conn.

Flatness—10% on tunable models  
15% on fixed models  
measured at max. sweep width

Attenuation—Vernier atten. 0-20 db.

(See general specs. and features on back page)



Model E2

| Models | Range         | Sweep Width |
|--------|---------------|-------------|
| E1     | 920-1400 mc.  | 0-50 mc.    |
| E2     | 1200-2000 mc. | 0-50 mc.    |
| E3     | 1700-2300 mc. | 0-50 mc.    |
| E201   | 1000-1400 mc. | 400 mc.     |
| E202   | 1400-1800 mc. | 400 mc.     |
| E203   | 1700-2300 mc. | 600 mc.     |

# ELECTRONIC SWEEPS



| Model | Center Freq. | Sweep Width |
|-------|--------------|-------------|
| L1    | 450-1800 kc. | 0-100%      |
| L2    | 1.5-5.0 mc.  | 0-100%      |
| L3    | 5-15.0 mc.   | 0-50%       |
| L4    | 10-25 mc.    | 0-50%       |
| L5    | 25-70 mc.    | 0-40%       |
| L6    | 50-125 mc.   | 0-30%       |

These ultra flat sweep generators are swept electronically using a saturating reactance. Continuous tuning is accomplished by means of a precision variable capacitor.

Toggle switches and constant impedance resistive pads provide a very convenient and accurate means of attenuation.

The performance of these models approaches perfection—output is well over 1 volt, flatness better than 5%. There is very low spurious and harmonic content and the leakage is so low that even high gain Radar IF strips are unaffected.

Output—well over 1 volt p. to p.

Impedance—50 ohms

Attenuation—Toggle switch 20,20,20,10,6,3 db.  
& vernier atten. 0-10 db.

Flatness—Within 5% over max. sweep width

(See general specs. and features on back page)

Add "C" to Model No. for Xtal Marker system employing 6 plug-in crystal-controlled markers and Birdy-By-Pass circuitry—i. e. L1-C

Add "M" for Variable Marker and Birdy-By-Pass circuitry—i. e. L1-M

Add "D" for Deluxe instrument with 6 plug-in markers, variable marker, harmonic marker, and Birdy-By-Pass circuitry—i. e. L1-D



Model SV-6AEG

## OPTIONAL FEATURES

- A** An attenuator having steps of 20, 20, 20, 20, 10, 6, 3. Other combinations of values not higher than 20 db each and not over 7 steps may be ordered.
- B** A dual attenuator having steps of 20, 20, 10, 6, 3, db on each section. The input of each attenuator is common. This arrangement is used to make connections to fixture for both IF and RF testing of TV front ends and for dual trace presentation for comparison to a standard unit.
- C** An extra marker on the IF position. One or sometimes two of these crystal controlled oscillators may be used to

provide one or two markers in addition to the video and sound marker on the IF Channel.

**Line voltage.** Special line voltage may be specified on standard American models.

**RF output monitor.** A crystal diode circuit may be added at the output of the attenuator to indicate the RF level at that point. This is often used in making VSWR and impedance measurements.

**Foreign specifications.** The *channel audio* and *sound marker* frequencies as well as line voltage and *frequency* specifications may be obtained.

**Sweep width and centering panel controls.** These controls which are normally used as internal adjustments may be installed on the front panel. This is desirable for engineering use.

**Sine wave sweep.** A sinusoidal sweep voltage may be substituted for the normal sawtooth which permits the use of the sine sweep present on some oscilloscopes.

**Special features.** Other modifications, not mentioned above, may be requested.

## ORDERING DATA

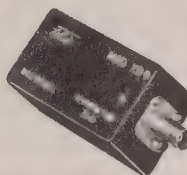
In ordering the SV-6 any of the following modifications may be specified. The modification letter, or letters, should be added to the model No. SV-6 (i.e., a unit with sweep width and centering controls on the front panel would be called SV-6G and a unit with this feature plus 40 db. additional attenuation would be called SV-6AG).

The above letter designations apply only to the Model SV-6

## VHF ACCESSORIES

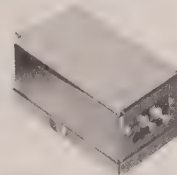
These detectors and balun are particularly recommended for use with Telonic VHF sweep generators.

### RF DETECTORS



XD-9

### VHF BALUN



BA-1

### SPECIFICATIONS

#### XD-9

#### XD-10

#### BA-1

Frequency range 1—250 mc.  
Impedance 75 ohms  
Connector BNC input  
BNC output  
VSWR 1.2:1

1—250 mc.  
300 ohms balanced  
Special input  
BNC output  
1.2:1

Channel 2—13  
75 to 300 ohms  
BNC input  
Special output  
1.2:1

## MODEL SV-2

The SV-2 has the wide, flat, sweep characteristics of the SV-6, but has no marker system or horizontal output. Since the sweep is sinusoidal, the 60-cycle sine sweep present in many oscilloscopes is used.



*Telonic*

INDUSTRIES, INC.

75 NORTH SECOND AVE.  
BEECH GROVE, INDIANA

# TELONIC

# VHF Sweep-Marker Generators

## FOR TV PRODUCTION, ENGINEERING, SERVICING

TELONIC sweeps are being used by a majority of the TV equipment manufacturers, including RCA, GE, Admiral, Oak, and GI. The features that are making them so popular are their excellent specifications (flatness, high output, wide sweep, etc.), efficient design (compact size and shape, simplicity of operation, accessibility for easy servicing),

outstanding performance (dependability, low maintenance), and the *ability of TELONIC to modify standard specifications to meet individual needs.*

Obsolete installations are being replaced with TELONIC units to increase production efficiency, reduce maintenance costs and to improve the quality of the product.

# New!

Model SV-6 BG

The new model SV-6 supersedes all previous models, SV-3, SV-3A and other special modifications that have been made available previously. It has the same basic circuits and convenient sub-chassis layout, but has improved electrical characteristics and a new panel arrangement. BNC connectors are used for greater convenience and standardization of connecting cables, as well as elimination of noise and hum pick-up that can occur when binding posts are used.

An engraved black anodized dial is standard on this model.

The flatness of this series is held to less than 5% over the entire sweep width, and to 1 or 2% between markers. A voltage doubler detector circuit monitors the complete RF output envelope. A three stage high gain DC-coupled amplifier amplifies any deviation and compensates for it by instantaneously changing the B+ to the sweep oscillator.

This method of producing a flat output has excellent long and short time stability and is unaffected by aging of parts and line voltage fluctuations.

Sweeping is accomplished electronically by magnetically saturating a ferrite core and thus changing the inductance of the oscillator tank circuit. The particular type of ferrite used has characteristics that produce a very linear change of frequency. This 13-position sweep generator uses a separate crystal on each channel to produce 2 pulse markers, one on the video and one on the sound frequencies. A special circuit forms pulses with much greater ac-



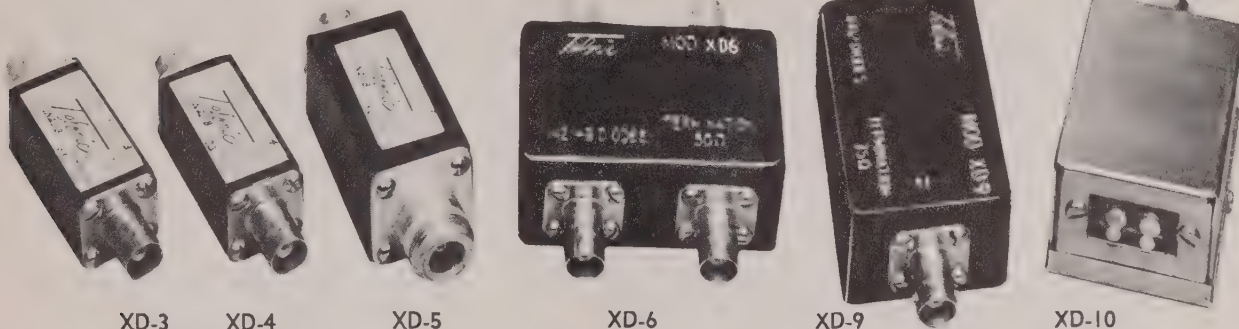
### CONDENSED SPECIFICATIONS

Range—12 channels & 43 mc. I.F.  
Sweep Width—25 mc. adjustable  
Output—Well over 1 v. p. to p. into 75 ohms  
Impedance—75 ohms (300 ohms balun included with each instrument)  
Flatness—5% over each channel (2% between markers) 10% over all  
Attenuation—20, 20, 10, 6, 3 & 10 db. vern. atten.  
Markers—Pulse-type markers on video and audio  
Style—Portable

curacy and stability than the usual multivibrator method. The positive pulse output is available on the front panel to be used to produce intensity markers or as sharp rectangular spikes, independent of the device under test, when connected to the CRT deflection plates.

Special features of this compact VHF-TV sweep and marker generator are: electronic sweep; 25 mc. sweep width; hi-level, flat output; special crystal-controlled pulse markers, and removable sweep and marker sub-chassis. Solid silver switch section contacts and clips are used for long switch life.

### for Detection of R. F. Signals



- Excellent match.
- Small size—light weight.
- Rugged construction—machined, anodized aluminum block.
- Crystals easily replaced.
- Simple, foolproof design.
- Standard resistance terminations.

These RF detectors are designed to provide the high degree of accuracy needed to fully utilize the flat output characteristics of modern-day precision sweep and signal generators.

The necessary electrical considerations for low VSWR are met while maintaining excellent mechanical factors such as: small size, light weight, rugged construction and easily-replaced diodes.

#### MODEL XD-3, XD-4, XD-5

The XD-3, XD-4 and XD-5 are extremely useful for a great variety of RF applications besides being used with Telonic sweep generators. The VSWR of these detectors is largely determined by the dimensions of the cavity and by the type of connectors used. The low VSWR of the XD-5 and the XD-3 is made possible by the use of a "N" type connector on the XD-5 and a special BNC connector on the XD-3. With standard polarity diodes, the output is negative.

#### MODEL XD-6, XD-7

These detectors are similar to the XD-3 and XD-4 except that twin circuits are used which allow choice of output voltage polarity.

#### MODEL XD-8, XD-9

These detectors utilize a voltage doubler circuit which has the obvious advantage of higher output. The most outstanding feature is that the entire envelope of RF is detected and thus errors due to non-symmetry and waveform distortion are minimized and greater accuracy is obtained.

#### MODEL XD-10

This 300 ohm detector, largely of interest to the TV industry, has a termination that is balanced to ground. Since balanced detection is used, the entire envelope is detected and non-symmetry and waveform distortion errors are lessened, thus obtaining greater accuracy.

### SPECIFICATIONS

| Model                                               | XD-3                        | XD-4      | XD-5                         | XD-6                       | XD-7              | XD-8            | XD-9            | XD-10                     |
|-----------------------------------------------------|-----------------------------|-----------|------------------------------|----------------------------|-------------------|-----------------|-----------------|---------------------------|
| Frequency Range-MC.                                 | 1-1000                      | 1-250     | 1-1000                       | 1-250                      | 1-250             | 1-250           | 1-250           | 1-250                     |
| Termination Ohms                                    | 51                          | 73        | 50                           | 51                         | 75                | 51              | 75              | 300                       |
| VSWR:1                                              | 1.1-500 MC.<br>1.2-1000 MC. | 1.3       | 1.05-500 MC.<br>1.1-1000 MC. | 1.2-500 MC.<br>1.1-250 MC. | 1.2               | 1.1             | 1.2             | 1.2                       |
| Input and Output Connections                        | "BNC"                       | "BNC"     | "N" Input<br>"BNC" Output    | "BNC"                      | "BNC"             | "BNC"           | "BNC"           | Special Lugs "BNC" Output |
| Termination Power Rating                            | 1/2                         | 1/2       | 1/2                          | 1/2                        | 1/2               | 1/2             | 1/2             | 1/2                       |
| Crystal Diodes<br>(Other similar types may be used) | IN21B                       | IN21B     | IN21B                        | IN21B                      | IN21B             | IN82            | IN82            | IN82                      |
| Type                                                | Half Wave                   | Half Wave | Half Wave                    | 2 Half Wave Units          | 2 Half Wave Units | Voltage Doubler | Voltage Doubler | Balanced                  |
|                                                     |                             |           |                              |                            |                   |                 |                 |                           |



## FOR TV PRODUCTION, ENGINEERING, SERVICING

TELONIC sweeps are being used by a majority of the TV manufacturers. The features that are making them so popular are their excellent specifications (flatness, high output, wide sweep, etc.) efficient design (compact size and shape, simplicity of operation, accessibility for easy servicing); outstanding performance (dependability, low maintenance); and the *ability of TELONIC to modify standard specifications to meet individual needs.*

Obsolete installations are being replaced with TELONIC units to increase production efficiency, reduce maintenance costs and to improve the quality of the product.



Model S3A-FT

The S3A-FT is an ideal UHF TV test instrument that has high level, flat output, wide sweep, four plug-in fixed adjustable markers with Birdy-By-Pass system and a precision Step-Attenuator. A four position detent system as shown above is also available. (Specify DT-4 detent system if desired.)

Range—440-920 mc.

Width—0-50 mc. at 500 mc.

Output—Well over 1 v. p. to p. into 50 ohms

Flatness—5% over max. sweep  
15% over entire range

Attenuation—TA-50 & vernier atten. 0-10 db.

Markers—4 Plug-in Fixed markers with  
Birdy By-Pass system

Style—Portable

(See general specs. and features on back page)



Model L5A-P



Model SV-3

This 13-position sweep generator uses a separate crystal on each channel to produce 2 pulse markers, one on the video and one on the audio frequencies. A special circuit forms pulses with much greater accuracy and stability than the usual multivibrator method.

Special features of this compact VHF-TV sweep and marker generator are: electronic sweep; 25 mc. sweep width; hi-level, flat output; special crystal-controlled pulse markers; and removable sweep and marker sub-chassis.

Style—Portable

Range—12 channels & 43 mc. I.F.

Sweep Width—25 mc. adjustable

Output—Well over 1 v. p. to p. into 75 ohms

Impedance—75 (300 ohms balun supplied) ohms

Flatness—5% over each channel—10% over all

Attenuation—20,20,20,10,6,3 & 10 db. vern. atten.

Markers—Pulse-type markers on video and audio

Style—Portable

(See general specs. and features on back page)

This TV IF sweep, Model L5A-P, and crystal-controlled marker generator is a variation of an L Model. 6 crystals are used in passive networks to accurately key pulse markers.

Center Frequency—35-55 mc.

Sweep Width—4-15 mc.

Output—1 v. into 75 ohms

Attenuation—20,20,20,10,6,3 and 10 db. vernier atten.

Markers—6 Crystal—controlled pulse-type markers

Style—Portable

(See general specs. and features on back page)

## TURRET



TA-50, TA-75

Attenuation—0,10,20,30,40,  
50 db.

Size—2 1/8" x 1 3/4"

Impedance—50 or 75 ohms

VSWR—1.2:1 to 500 mc.

1.3:1 to 1000 mc.

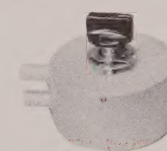
Shaft—2" x 1/4" round

Accuracy—.25 db. on all steps to 10 db.

.5 db. on higher steps

Connectors—BNC

Power—1/2 watt average, 1 kw peak  
(Mounts like a potentiometer)



TB-50, TB-75

Attenuation—0,1,2,3,4,5,6,  
7,8,9,10,20 db.

Size—3" x 1 3/4"

## DECADE



TAD-50  
TAD-75

Two 6-position and 12-position attenuators arranged in decade allow any combination up to 110 db. in 1 db. steps.

Attenuation—0-110 db.

Impedance—TAD-50—50 ohms

TAD-75—75 ohms

VSWR—1.2:1 to 500 mc.

1.3:1 to 1000 mc.

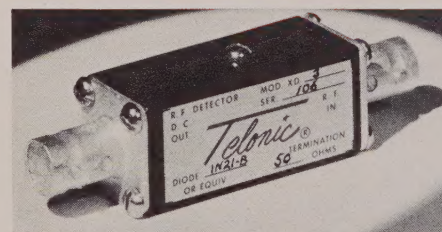
Accuracy—.25 db. to 10 db.

1.25 db. to 110 db.

Size—9 1/2" x 3" x 4 3/4"

**TOGGLE SWITCH ATTENUATORS**—Several models available—up to 100 db. in 1 db. steps—Range—DC—200 mc.  
Also, Toggle Switch Attenuators built to order. Write for complete information.

## RF DETECTORS



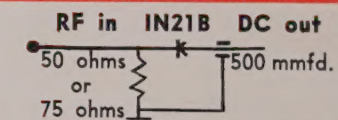
Frequency Range—1-1000 mc.  
(useful to 2500 mc.)

VSWR—1.05:1 to 500 mc.

1.1:1 to 750 mc.

1.2:1 to 1000 mc.

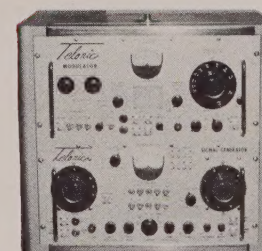
Small, black anodized aluminum  
block. Easily-replaced crystal.



| Models | Imped.  | Connectors |
|--------|---------|------------|
| XD-3   | 50 ohms | BNC        |
| XD-4   | 75 ohms | BNC        |
| XD-5   | 50 ohms | N          |

## NEW Telonic INSTRUMENTS

### RADAR TEST SET



MOD. SSX-1/PAM-1

Complete signal source for testing Radar IF strips  
Includes: AUDIO — 50 WATT VIDEO PULSE — C.W.  
PULSE — C.W. — MODULATED C.W. — R.F. SWEEP  
— VARIABLE MARKER — CRYSTAL HARMONIC  
MARKER.

(Detailed spec. sheet available from Telonic or Telonic representatives)

### DOUBLE RANGE SWEEPS



A new "double" range sweep generator is now available. This multi-purpose unit includes two sweeping oscillators—one wide-band fixed tuned oscillator and the other a normal tunable sweep oscillator covering the same frequency. Frequency ranges, styles, and markers of either the Master Line or the Extended Range may be provided.

Model is designated by combining the number of the standard tunable and fixed sweeps. (I.E.: E3-203-D)

**WORLD-WIDE**

**SALES**

**REPRESENTATIVES**

These experienced field engineers are available to help you. Please call on them to discuss your needs.

#### EAST

**Baltimore**—H. L. Hoffman & Co., 310 E. 25th St.  
Phone—BElmont 5-8073

**Englewood, N. J.**—H. L. Hoffman & Co., 44 N. Dean St.  
Phone—Englewood 3-1012

**Lynn, Mass.**—H. L. Hoffman & Co., 113 Monroe St.  
Phone—Lynn 8-1710

**Abington, Penna., (Philadelphia)**—H. L. Hoffman & Co.,  
1468 Old York Rd., Phone—TUrner 4-9900

**Rochester, N. Y.**—H. L. Hoffman & Co., 662 Monroe Avenue  
Phone—BRowning 1-2144

**Schenectady, N. Y.**—H. L. Hoffman & Co., 611 Union St.  
Phone—FRanklyn 7-0831, 7-9600

**Stamford, Conn.**—H. L. Hoffman & Co., 113 Monroe St.  
Phone—Flreside 8-2810

**Syracuse, N. Y.**—H. L. Hoffman & Co., 500 Lafayette Bldg.  
Phone—SYracuse 3-4645; SYracuse 2-4704

**Westbury, L. I., N. Y.**—H. L. Hoffman & Co., 804 Newbridge Ave.  
Phone—EDgewood 4-5600 TWX—Westbury, N. Y. 118

#### MIDWEST

**Chicago, Illinois**—Ridgway Engineering, Inc., 6100 W. North Ave.  
Phone—TUxedo 9-5715 TWX—CG-982

**Indianapolis, Ind.**—Ridgway Engineering, Inc., 1606 N. Illinois St.  
Phone—WAlnut 5-6464 TWX—IP-263

**Dayton, Ohio**—Electro Sales Associates, 512 Orangewood Drive  
Phone—WAlnut 5426

**Euclid, Ohio (Cleveland)**—Electro Sales Associates, 281 E. 216th  
Street Phone—REdwood 2-7444

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**Fort Worth, Texas**—Industrial Associated Electronics, 5907 E.  
Lancaster Ave. Phone—JEfferson 1-1132 TWX—FT-8150

**Wichita, Kansas**—Industrial Associated Electronics,  
723 S. Broadway Phone—AMherst 5-2567

**Albuquerque, New Mexico**—Industrial Associated Electronics,  
419 Central Ave., N.W. Phone—3-3585

#### WEST

**Los Angeles, Calif.**—T. Louis Snitzer Co., 5354 W. Pico Blvd.  
Phone—WEbster 8-2074

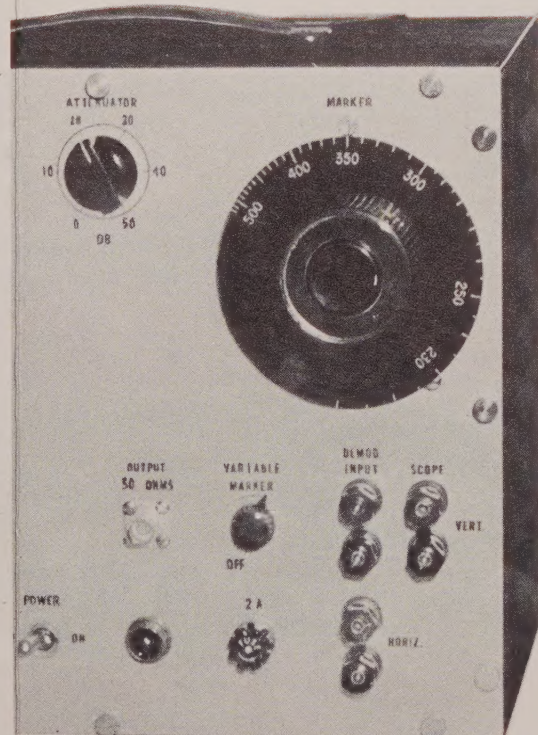
**Sunnyvale, Calif.**—T. Louis Snitzer Co., 510 S. Mathilda Ave.  
Phone—REgent 6-6733

For information relative to sales outside United States  
contact Telonic.

**Telonic**  
**INDUSTRIES, INC.**  
BEECH GROVE, INDIANA

CATALOG 7A

**Telonic**



SWEEP AND MARKER GENERATORS TO 2400 mc.

**Complete Catalog**

BEECH GROVE, INDIANA

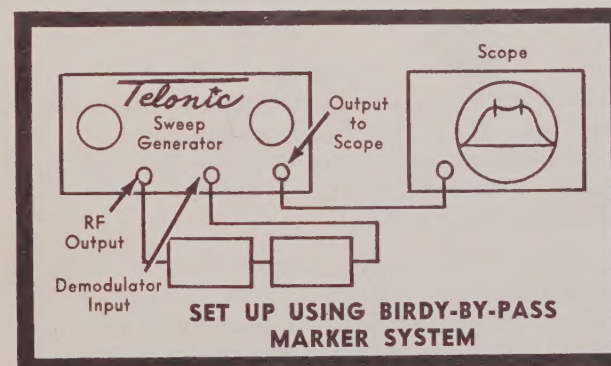
## DESCRIPTION OF MARKER SYSTEMS

### BIRDY-BY-PASS

The Birdy-By-Pass marker system is standard on the MASTER LINE, H-3, EXTENDED RANGE, and the ELECTRONIC SWEEP models.

In this system, beat or birdy pips are produced by mixing a sample of the sweep oscillator signal with the marker output; the "birdies" are fed through an amplifier and are added to the demodulated sweep signal before it is connected to the scope vertical amplifier. The markers completely by-pass the device under test.

Since the markers are produced directly, no frequency error can occur other than in the marker oscillator itself. Thus, the error that is present in the pulse system, due to keying of the multivibrator, is avoided. In addition to its major features—accuracy, stability and versatility, it has the advantage of simplicity, allowing this system to be used on the Portable style models.



### CABINET STYLES

#### PORTABLE STYLE

The Portable Style is particularly appropriate in applications where space is at a premium. The cabinet measures only 10" x 12" x 9½" and weighs approx. 25# (Shpg. wt 40# approx.) Louvers on the sides and perforated panels on the top provide ventilation. Leather handle and the compact size allow for easy-carrying. This style is used on standard Telonic sweep generators, except the H-3 and Deluxe models.

#### BENCH STYLE

The Bench style is used on Deluxe models and H-3 and provides ample panel and chassis space for combination marker systems and extra features. The studio-type cabinet measures 23" x 16" x 13". These models weigh approx. 50# (Shpg. wt. 100# approx.) Chrome-plated handles are provided on each side. The back is partially open and the top and bottom are removable for easy servicing and adjustment of unit.

### PLUG-IN MARKERS\*

Plug-in markers of two types are available, either crystal-controlled oscillators with an accuracy of .005% or fixed oscillators adjustable over a wide range with a stability of .1%. Extra units may be obtained from TELONIC to provide for changing requirements.

(\*Designated by "C" for Crystal type; "F" for Fixed type)

### CALIBRATED VARIABLE MARKER\*

A calibrated variable marker is available for nearly all ranges. They are individually calibrated and engraved to an accuracy of .25% at intervals spaced for best readability.

(\*Designated by "M" in Model No.)

### CRYSTAL-CONTROLLED HARMONIC MARKERS\*

Crystal-controlled harmonic markers are available in Deluxe Models utilizing the Birdy-By-Pass marker system. Crystal oscillator and frequency multiplier circuitry produces markers at multiples of the crystal frequency. The following frequencies are available:

- Above 1200 mc. — 20 mc.
- Above 500 mc. — 10 mc.
- Below 500 mc. — 5 mc.
- Below 100 mc. — 2.5 mc.
- Low Ranges — 1 mc.

### FEATURES AND SPECIFICATIONS COMMON TO ALL MODELS

- Zero Base Line—Return sweep is blanked
- Horiz. Sweep Voltage—Sawtooth of approx. 40 volts peak to peak
- Radiation—Less than 10 microvolts
- Source VSWR—Normally below 1.2:1
- Display Linearity—Better than 1.2:1
- Power—115 v. 60 cps (50 cps available)

#### DT-4 Tuning Detent

A 4 position mechanism may be added to the sweep generator's tuning dial as a production aid. Each position is easily adjusted from the front of the instrument.

19674

